Study of charge carriers' transport in organic solar cells by illumination area shifting

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Mots-clés	Bulk heterojunction [2], charge collection optimization [3], charge mobility [4], efficiency calculations [5], grid electrode architecture optimization [6], open circuit voltage [7], Organic solar cells [8]
Résumé en anglais	This paper presents an original investigation method to highlight the differences of mobilities and transport mechanisms of charge carriers in organic materials solar cells. Two types of polymer: fullerene solar cells were investigated: ITO/ PEDOT:PSS/P3HT:PCBM /Al and ITO/PEDOT:PSS/PCDTBT:PCBM/Al. The I–V characteristics were done under standard illumination (1000 W/m2) using a mask placed at different distances from the collecting cathode position. The influence of the distance between the irradiation area and the position of the collecting electrode on the performances of solar cells was studied. It has been observed that the short-circuit current and the open-circuit voltage considerably increase with the decrease of the distance between the cathode and the irradiation area. This study method gives also the opportunity to find the suitable collecting grid layout (distance between electrodes) depending on the nature of the organic materials. Moreover it can also explain the differences observed between the reported values in literature for the conversion efficiencies of organic solar cells.
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[2] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=4883
[3] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=23647
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